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than the preglacial Miami had, but hardly steeper than the gradients of streams occupying the channels of its present tributaries, whether they flowed north or south.

The accompanying map only shows a portion of the Silurian drainage areas to the north of the Ohio. It might have added force to the above argument, to have shown the drainage from the south as well. It would have been found to present an appearance symmetrical with that from the north. In spite of arguments derived from width-of-channel comparisons, etc., it still looks as if the Ohio River were the parent stream and that its present tributaries, the Miami, the Licking, the Kentucky have never been tributary to anything else, but represent normal lateral stream development.

ARTHUR M. MILLER.

STATE COLLEGE OF KENTUCKY.

#### A POST-GRADUATE SCHOOL OF BIBLIOGRAPHY.

TO THE EDITOR OF SCIENCE: It will not be difficult for any one familiar with the development of libraries and librarianships in this country to see that we have arrived at a turning-point in their history. The large and even moderate sized libraries are developing and will continue to develop special departments in which acquisition is done by collecting rather than selecting. These departments will need for their care and utilization librarians with special knowledge. The largest libraries will specialize in several departments and consequently will need a staff of reference librarians each a specialist—a 'faculty,' as Mr. Melvil Devey calls it in a very suggestive article in the July number of *The Library*. Lastly, highly specialized libraries, each devoted to some special science or group of sciences, will grow up.

This development will necessitate some very radical changes in the class of men who will take up library work, and consequently in the provision for the education of librarians. We shall see men with university education taking responsible positions in libraries instead of seeking university professorships, and the demands of such men for opportunities to prepare themselves for their life-work without having to go back to the college or even high-school grade must be met. It cannot be met by the pres-

ent library schools as now constituted. The work these schools are doing in preparing young men and women for subordinate positions in popular libraries is an absolutely necessary one and one that must not be slighted. In addition to these we need special schools for the education of scientific librarians and bibliographers. Perhaps one or the other of the library schools can develop a school of this grade. However that may be, there should be established at the large universities special schools of bibliography of the same rank as the schools of engineering, commerce and history.

The present writer had occasion to bring this question to the attention of the librarians at the conference of the American Library Association in July of this year, as has already been noticed in SCIENCE. The question is certainly of great importance, not only to librarians, but to the scientific and educational world at large, and the purpose of these lines is to invite a discussion of the ways and means for the establishment of such schools. I hope that SCIENCE will open its columns for this discussion and that educators and scientific men and librarians, too, will take part in it.

A school such as here proposed would naturally be open to any one who would take up the study of bibliography or any of its branches, and not exclusively to prospective librarians. These studies have a fascination of their own, just as literary history, philosophy or mathematics, and are just as capable as any of these sciences of inspiring with enthusiasm the searcher after truth.

The curriculum of a school of bibliography should include the following subjects:

1. The literature of bibliography, with practical exercises in the handling of bibliographical repertories and indexes and in bibliographical compilation.

2. History and methodology of the sciences, and comparative history of literature (literature taken in its broadest sense), including the study of the systems of classification of knowledge and their relations to the schemes for classification of books.

3. History of printing and bookselling, with special emphasis on the invention of printing, and exercises in the cataloguing of incunabula.

4. History of libraries and library administration.

5. Paleography, classical and mediæval; diplomatics; administration of archives.

The studies in the schools of bibliography should lead up to the degree of Doctor of Philosophy as the studies in any other school. To create a special degree in 'library science,' as has been done in the library schools, seems unnecessary.

AKSEL G. S. JOSEPHSON.

THE JOHN CRERAR LIBRARY,  
CHICAGO, Sept. 7, 1901.

#### NOTES ON INORGANIC CHEMISTRY.

It has been often claimed that the presence of nickel in dust is a sufficient criterion to distinguish it as being cosmic rather than terrestrial in its origin. Hartley and Ramage have, however, shown in a paper recently read before the Royal Society that nickel is found in soot, and hence that nickeliferous dust may be of terrestrial origin. They also called attention to the wide distribution of gallium in small traces, being found in all aluminous minerals, in many flue dusts, in many iron ores, and in soot and atmospheric dust. A dust is described which is probably of cosmic origin. It fell on a calm night in November, 1897, was magnetic and very uniform in composition, and unlike volcanic dust or the dust of any known terrestrial source.

A CONTINUATION of Gautier's work on the rare elements in the crystalline rocks reveals not only the presence of nitrogen and argon, but also iodine and arsenic. Helium was not found. The gases of mineral waters and the gases issuing from the earth's crust into the atmosphere seemed to be formed by the action of water at high temperature upon the nitrides, argonides, carbides, sulphides, arsenides and other accessory constituents of the igneous rocks.

THE action of manganese dioxid and other finely-divided substances in facilitating the liberation of oxygen from potassium chlorate at a low temperature, is considered by some to be merely mechanical. After a series of experiments at the Explosives Committee's laboratory at the Royal Arsenal, Woolwich, Sodeau comes to the conclusion "that the supposed ability of

chemically inert solid particles to facilitate the decomposition of potassium chlorate is unsupported by experimental evidence, and, if existing, is inadequate to explain even a small fraction of the great facilitation produced by the oxides of manganese, iron, cobalt, nickel, and copper. The action of the latter substances would therefore appear to be entirely chemical."

THE discovery, or rather the isolation, of a new element has been announced by M. Demarçay, in the *Comptes Rendus*. Some fifteen years ago Sir William Crookes called attention to an anomalous band in the spectrum of samarium, which he attributed to a hypothetical meta-element which he called  $S^d$ . A few years later De Boisbaudran described a series of lines in the spark spectrum of samarium, and called the element which he supposed their cause  $Z\zeta$ . The element causing the band and the lines has now been isolated by Demarçay and named *Europium*. It has an atomic weight of about 151, and in its properties lies between gadolinium and samarium.

A NEW and interesting case of isomorphism is noted by Guthrie in the *Berichte*, between one of the modifications of potassium tellurate,  $K_2TeO_4 \cdot 2H_2O$ , and potassium osmate  $K_2OsO_4 \cdot 2H_2O$ . Mixed solutions of these two salts crystallize out together. This is one of the very few instances in which tellurium shows an analogy with the metals of the eighth group of the periodic system.

A PAPER has recently appeared in the *Journal de Pharmacie et de Chimie*, by E. Jungfleisch, on the 'Sulfur Industry in Sicily.' The output has increased from 150,000 tons in 1860 to 447,000 tons in 1898. The world's production at these two dates was 157,000 and 488,000 tons, Sicily thus furnishing about 90 per cent. The price during this period has not varied very largely, having been 120 francs in 1860, 142 in 1875, 100 in 1880 and 92 francs a ton in 1898. The amount of sulfur in the ore varies from a very rare richness of 75 per cent. to 20 or 25 per cent. of sulfur in the ordinary ore. A 30-per-cent. ore is considered rich, while ores are worked with as little as 10 or even 8 per cent. Poorer ores than this cannot be worked profit-